Experiment 65: Manganese Thermite from Batteries

A while ago, in *Experiment 46: Manganese Dioxide Thermite*, I attempted to make manganese metal for my element collection using thermite with manganese dioxide scavenged from batteries. The experiment failed. The batteries simply have too many contaminants (carbon, zinc oxide, etc.) to sustain a thermite reaction.

After reading some posts on ScienceMadness.org, I determined which steps would need to be taken to purify the manganese dioxide. I first washed the manganese-containing battery paste with water and vinegar, then dissolved everything in HCl. I filtered off my now-$MnCl_2$ solution from the carbon, but it was contaminated with iron. NurdRage's selective precipitation procedure came in handy for resolving that issue, and finally, I got a pretty pink solution - pure $MnCl_2$!

https://www.youtube.com/watch?v=BCmTzZa6ncY

I added NaOH to that solution to make manganese hydroxide, which oxidizes rapidly in air to Mn_2O_3, an oxide suitable for thermite. After baking my hydroxide slush in the oven to help along the oxidation, I mixed my Mn_2O_3 with aluminum powder and lit it using a magnesium ribbon. Unlike my previous manganese thermite attempts, this one violently flared up and reacted quite vigorously.

Even better, I recovered some very beautiful shiny lumps of manganese metal. While the thermite only gave a 23% yield on account of being so violent, it added another element to my collection, which is something to celebrate for sure.